ASTRONOMICAL SOCIETY OF LONDON.

March 14, 1828. No. 10.

The first paper read this evening was the following:—Ephemeris of the place of Encke's Comet, during the time of its re-appearance at the end of the present year. Drawn up at the request of the Council of the Society. By F. Baily, Esq.

1828.	Æ	Dec.	1828.	Æ	Dec.
	h m s	° ′		h m s	° ′
Aug. 23	1 47 24	+22 43	Nov. 15	21 58 4	+18 25
27	1 47 8	23 20	17	21 49 36	17 20
31	1 46 12	23 57	19	21 41 20	16 13
Sept. 4	1 44 40	24 34	21	21 33 16	15 5
8	1 42 16	25 11	23	21 25 20	13 57
12	1 39 0	25 48	25	21 17 36	12 48
16	1 35 44	26 24	27	21 9 56	11 38
20	1 29 20	26 58	29	21 2 20	10 27
24	1 22 36	27 30	Dec. 1	20 54 44	9 14
28	1 14 28	27 59	3	20 47 4	8 1
30	1 9 48	28 12	5	20 39 20	6 45
Oct. 2	1 4 48	28 23	7	20 31 20	5 27
4	0 59 16	28 32	9	20 23 12	4 7
6	0 53 24	28 40	11	20 14 40	2 42
8	0 47 4	28 45	13	20 5 48	+ 1 14
10	0 40 16	28 47	15	19 56 28	— 0 20
12	0 33 4	28 47	17	19 46 40	1 58
14	0 25 24	28 43	19	19 36 20	3 42
16	0 17 24	28 36	21	19 25 32	5 32
18	0 9 0	28 25	23	19 14 20	7 28
20	0 0 16	28 9	25	19 2 48	9 28
22	23 51 12	27 50	27	18 51 16	11 31
24	23 41 52	27 25	29	18 40 0	13 35
26	23 32 24	26 56	31	18 29 28	15 38
28	23 22 44	26 23	1829.		
30	23 13 0	25 44	Jan. 10	18 4 24	24 14
Nov. 1	23 3 12	25 1	13	18 10 16	25 50
3	22 53 28	24 14	16	18 20 12	26 57
5	22 43 48	23 23	19	18 31 4	27 43
7	22 34 16	22 29	21	18 39 20	28 4
9	22 24 52	21 32	26	19 0 40	28 24
11	22 15 44	20 31	31	19 21 4	28 19
13	22 6 48	+19 29	Feb. 9	19 53 52	—27 34

The first part of the above ephemeris (to the end of the year 1828) is taken from Mr. Encke's own computations for Paris time $0^d.3$, as inserted in Professor Schumacher's *Astronomische Nachrichten*, No. 123. That part of it which belongs to the ensuing year, 1829, is taken from a letter addressed to the President of this Society by Dr. Olbers, and is computed for the time of midnight at Paris. The positions are computed for every third or fourth day only, at the beginning and end of the ephemeris, and for every second day towards the middle: this being quite sufficient to enable the observer to find the place of the comet in the heavens. The original computations are extended only to minutes of space; but the right ascensions are here converted into the nearest second of time, for the convenience of the observer.

[It being desirable that as many observations should be made of this comet as possible, particularly in the southern hemisphere, where it will probably be seen after its return from the sun, an extra number of copies of the above ephemeris have been struck off for distribution, not only amongst the Members of the Society, but also for circulation in various parts of the world where the comet is likely to be seen. And Capt. Foster has kindly undertaken to distribute them as much as possible in those parts of the southern hemisphere at which he may touch during the scientific voyage in which he is about to embark.]

There was next read a paper, " On finding the rates of time-keepers;" by E. Riddle, Esq. In this communication the author observes, that there are many persons fond of astronomy who are not possessed of a transit instrument, or who have not a convenient situation in which to place it; and many others, such as nautical men in particular, who have not the means of using one, who are desirous, on many accounts, of knowing the *rates* of their chronometers, independent of the absolute time which they indicate. The method of equal altitudes on *each side* of the meridian is the course usually pursued on such occasions; but Mr. Riddle proposes another mode, often much more convenient in practice and equally correct in its results; viz. by taking equal altitudes of a fixed star on the *same side* of the meridian, on successive nights. It is well known that a star will, at the same sidereal hour, arrive at the same altitude for several succeeding nights: the only difference which occurs arising from the small change in the aberration, and also from the variation in the refraction The former is insensible, if the interval between the observations be not too long; and for the latter, appropriate tables are given. The best time for the observation of such stars is when they are due east or due west; and any known star may be chosen for the purpose. All we have to do, therefore, is to note the difference of the two consecutive times at which the star attains the same altitude (whatever it be) on the same side of the meridian; and if that difference be *less* than $3^m\ 55^s,91$, the chronometer (presuming that it is regulated to mean solar time) will have *gained*; and if *more*, it will have *lost* so much in a sidereal day. And if the observations are made at an interval of *n* days, the *n*th part of the difference between the times of observation, compared with 3^m $55^s,91$, will in like manner give the mean rate for that interval; and if this quantity be multiplied by 1,0027, it will give the rate for a mean solar day. The author concludes his paper with several practical examples of the method; and also with a formula for reducing a series of observations made on any one night, to the same altitude as shewn by a series made on any other night: whereby the whole become strictly comparable.

Lastly, there was read the following communication from the Rev. Thomas John Hussey to Francis Baily, Esq.

"In forming a correct catalogue of the stars situated between 15° N. and 15° S. declination, and extending from 13^h 56^m to 15^h 4^m R.A. from the catalogues of Piazzi and Bradley, and the observations of Lalande and Bessel, Mr. Dawson and myself have been much struck with the difference between the places of particular stars, as laid down by Piazzi and Bradley, and the places assigned by reducing the observations of M. Bessel. The results obtained from the *Histoire Céleste* come as nearly to the standard catalogue as can be expected, considering the nature of the instrument employed for determining the zenith distances, and thence the declination in which principally the differences exist: some few of these between observations of the same star are rather unaccountable, others may be attributed to errors of the press; they are as follow."—*Histoire Céleste.*

Page		h	m	s		°	′	″	read
Page 154	Æ.	14	42	$\overline{44}.5$	ZD.	57	2	12	read 34^s
— 155	—	14	13	43	—	50	$\overline{2}$	36	— 12′
— 155	—	$\overline{14}$	59	38·5	—	50	30	16	— 13^h
— 155	—	14	32	52·4	—	$\overline{59}$	5	42	— 49°
— 156	—	14	37	47	—	$\overline{50}$	45	34	— 58°
— 167	—	15	2	36	—	38	$\overline{47}$	6	— 27′
— 289	—	14	44	$\overline{33}.5$	—	61	10	8	— 32^s?
— 291	—	14	52	7·3	—	46	$\overline{59}$	0	— 58′
— 340	—	14	45	$\overline{56}$·5	—	54	20	49	— 50^s
— 471	—	14	46	$\overline{18}$	—	39	5	22	— 8^s

Between the places shewn by the observations of Lalande and those of M. Bessel, even where there are more than one observation by each of these astronomers, there are differences more or less considerable in *almost* every instance; occasionally, however, there is a surprising coincidence. On this subject we may hereafter trouble you with some remarks, my present object being to point out the differences between the standard catalogue of M. Piazzi and a catalogue reduced to 1800 from the observations of M. Bessel, of the only stars comprised within the above limits, which have been observed more than once by M. Bessel, so as that the place of the star may be considered as pretty nearly ascertained by this indefatigable astronomer alone. Their number amounts to 31, and the results are exhibited in the following table. The differences are expressed in space.

No.	Mag.	Right Ascension.		Diff.	Declination.		Diff.	No. of Obs.	When observed.	
		Piazzi.	Bessel.		Piazzi.	Bessel.				
		h m s	h m s	″	° ′ ″	° ′ ″	″			
1	8	13 56 25,87	13 56 25,60	— 4·10	+11 47 14·60	+11 47 13 24	—1·37	2	1822—3	
2	8	57 39,71	57 41,29	+23·69	—11 36 26·20	—11 36 29·51	+3·31	2	1824	+ 0·9872 annual proper motion?
3	8	59 39,27	59 39,68	+ 6·20	+11 12 22·50	+11 12 17·59	—4·91	2	1822—3	
4	8	14 0 25,10	14 0 25,47	5·49	—10 59 58 70	—11 0 1·45	+2·75	3	1824	
5	8	36,90	37,04	+ 2·09	+ 1 45 9·00	+ 1 45 4·15	—4·86	2	1822	
6	8·9	54,84	54,65	— 2·91	+ 5 21 15·40	+ 5 21 12·76	—2·64	2	1822	
7	7	1 54,80	1 55,11	+ 4·64	— 8 57 8·00	— 8 57 12·90	+4·90	3	1824	
8	8	2 53,47	2 53,60	+ 1·97	+ 8 57 20·00	+ 8 57 19·06	—0·94	2	1823	
9	7·8	3 57,10	3 57,11	+ 0·08	— 5 0 37·00	— 5 0 34·58	—2·43	2	1822—4	
10	7	4 6,50	4 6,96	+ 6·83	+12 56 30·20	+12 56 26·13	—4·08	2	1822	
11	6	5 3,40	5 3,47	0·99	+11 2 59·00	+11 2 50·41	—8·59	3	1822—3	
12	6	11 40,87	11 41,10	+ 3·42	— 1 3 58·00	— 1 4 3·47	+5·47	2	1822	
13	8	12 4,70	12 4,85	+ 2·19	— 6 50 29·00	— 6 50 34·76	+5·76	3	1824	
14	6	13 32,70	13 33,05	+ 5·20	+ 9 21 50·20	+ 9 21 51·37	+1·17	2	1823	This star is double, and the observations are of the one which is of Mag. 6.
15	7	14 9,67	14 9,66	— 0·09	+ 9 9 36·40	+ 9 9 32·79	—3·61	3	1822—3	
16	7	14 28,24	14 28,40	+ 2·36	+ 9 0 19·10	+ 9 0 14 07	—5·03	3	1822—3	
17	7·8	17 51,90	17 51,99	+ 1·35	— 9 5 56·00	— 9 6 1·53	+5·53	3	1824	
18	8	22 11,70	22 11,89	+ 2·81	+ 5 2 4·70	+ 5 2 0·91	—3·80	2	1822	
19	8	23 29,87	23 30,17	+ 4·54	+ 7 11 4·50	+ 7 10 56·33	—8·18	2	1822—3	
20	8	25 37,72	25 37,54	— 2·71	— 8 43 56·00	— 8 43 50·56	+4·56	2	1824	
21	8	26 43,96	26 44,15	+ 2·78	— 3 0 43·70	— 3 0 50·92	+7·22	2	1822	
22	7·8	27 24,07	27 24,39	+ 4·88	— 4 40 27·50	— 4 40 19·28	—8·22	2	1822—4	
23	8·9	28 29,94	28 30,42	+ 7·23	— 4 54 46·50	— 4 54 52·48	+5·98	2	1822—4	
24	9	30 27,54	30 27,39	— 2·25	— 5 35 29·20	— 5 35 32·11	+2·91	2	1823—4	
25	7·8	37 18,80	37 19,06	+ 3·83	+ 2 53 2·05	+ 2 52 55·77	—6·74	2	1822	Bessel's obs. quite close.
26	8	41 30,13	41 30,11	— 0·35	—14 33 23·40	—14 33 26·45	+3·05	2	1824	
27	7·8	43 9,30	43 9,44	+ 2·05	— 8 15 31·00	— 8 15 35·93	+4·93	2	1824	
28	4·5	50 18,20	50 18,34	+ 2·13	— 7 42 55·80	— 7 43 2·41	+6·61	2	1824	
29	8	52 58,50	52 59,09	+ 8·84	— 6 46 37·70	— 6 46 43·25	+5.55	2	1823—4	
30	9	53 40,74	53 41,22	+ 7·23	—14 12 20·20	—14 12 25·61	+5·41	2	1824	Bessel's obs. quite close.
31	8	58 2,07	58 2,32	+ 3·75	—13 13 29·50	—13 13 32·33	+2·83	3	1824	

" In many of the above cases it is probable that the difference between Piazzi's catalogue for 1800, and one reduced to that epoch from Bessel's observations, may arise from error of observation ; in others the almost identity of the observations seems to prove at once the skill of the observer, and a proper motion in the star; while again there is one (No. 2) which possibly may be regarded as conclusive on the latter point. I would also suggest two instances of what appear errors of the press, or perhaps in reading off the instrument, in M. Bessel's zones.

Z. 154. Æ. $14^h\ 33^m\ 33^s,7$. Dec. $12° \overline{41}' \ 22''{\cdot}4 +$ Unless 26′ be read for 41′, this star of the sixth magnitude, 32 Bootis, will differ from Piazzi's catalogue $+\ 14'\ 56''{\cdot}88$.

Z. 162. Æ $14^h\ 37^m\ 10^s,3$. Dec. $\overline{9}°\ 55'\ 36''{\cdot}8 +$ Unless 8° be read for 9°, this star of the 7·8 magnitude will differ from Piazzi 1° 0′ 0″·39."

J. Moyes, Castle Street, Leicester Square.